2. (Amended) The device as in claim 1, wherein the bias layer comprises a region of the substrate proximate to the first surface that is more heavily doped with material of the first conductivity type than other regions of the substrate.

3. (Amended) The device as in claim 1, wherein the bias layer comprises a transparent, conductive layer formed proximate to the first surface.

4. (Amended) The device as in claim 3, wherein the bias layer includes a heavily-doped polycrystalline layer of the semiconductor material.

A1 Cont

5. (Amended) The device as in claim 1, wherein the bias layer includes a first transparent, conductive layer formed on the first surface and a second layer comprising a region of the substrate proximate to the first surface that is more heavily doped with a material of the first conductivity type than other regions of the substrate.

6. (Amended) The device as in claim 1, further comprising a circuit layer proximate to the second surface and configured to provide a gate contact to and a readout circuit for each doped gate region.

7. (Amended) The device as in claim 1, further comprising a scintillation array comprising scintillation elements, said scintillation elements operable to convert incident radiation of a first wavelength outside a characteristic spectral response range of the substrate into secondary photons of a second wavelength within the characteristic spectral response range of the substrate, each of said scintillation elements aligned with and optically coupled to a corresponding one of the array of pixels, and wherein the scintillation array includes optically reflective surfaces disposed between the scintillation elements to optically isolate one scintillation element from another.

8. (Amended) The device as in claim 7, wherein one of the first and second conductivity types is n-type and the other is p-type.

10. (Amended) The device as in claim 7, wherein the bias layer comprises a heavily-doped crystalline region of the substrate proximate to the first surface.

A2

11. (Amended) The device as in claim 7, wherein the grid of conducting wires comprises a metallic material.

13. (Amended) The device as in claim 7, further comprising an anti-reflection layer proximate to the bias layer within each pixel and configured to reduce reflection of photons incident on the first surface.

A3

15. (Amended) The device as in claim 13, wherein the anti-reflection layer includes a dielectric layer having a refractive index that has a relation with a refractive index of the bias layer.

A4

16. (Amended) The device as in claim 1, wherein one of the first and second conductivity types is n-type and the other is p-type.

18. (Amended) The device as in claim 7, further comprising an anti-reflection layer proximate to the bias layer within each pixel and configured to reduce reflection of photons incident on the first surface.

A5

19. (Amended) A semiconductor position-sensitive radiation detection device, comprising:

an array of photodiodes formed in a substrate having a first surface and a second surface opposing the first surface, wherein a bias layer proximate to the first surface is electrically conducting to provide a common bias potential to the photodiodes and is optically transparent to receive input photons to be detected; and

a grid of conducting wires proximate to and in electrical contact with the bias layer and configured to define an array of pixels corresponding to the array of

photodiodes, wherein the grid of conducting wires is further configured to distribute a common potential to the photodiodes.

A5 cont

20. (Amended) The device as in claim 19, further comprising a scintillation array of scintillation elements operable to convert incident radiation at a first wavelength outside a characteristic spectral response range of the photodiodes into secondary photons at a second wavelength within the characteristic spectral response range of the substrate and coupled to the grid of conducting wires proximate to the bias layer, each of said scintillation elements aligned with and optically coupled to a corresponding one of the array of pixels, and wherein the scintillation array includes optically reflective surfaces disposed between the scintillation elements to optically isolate one scintillation element from another.

21. (Amended) The device as in claim 20, further incorporating an anti-reflection layer proximate to the bias layer within each pixel and configured to reduce reflection of photons incident to the first surface.

24. (Amended) The device as in claim 19, further incorporating an anti-reflection layer proximate to the bias layer within each pixel and configured to reduce reflection of photons incident to the first surface.

A6

25. (Amended) The device as in claim 19, further comprising a circuit layer proximate to the second surface and configured to provide electrical contact with said array of photodiodes.

26. (Amended) The device as in claim 19, wherein the substrate is doped to exhibit a first conductivity type, and wherein the bias layer comprises a region of the substrate proximate to the first surface, where the region is more heavily doped with a material of the first conductivity type than the rest of the substrate.

27. (Amended) The device as in claim 19, wherein the bias layer comprises a transparent conductor layer formed proximate to the first surface.

A6 cont

28. (Amended) The device as in claim 27, wherein the substrate comprises a semiconductor material, and wherein the transparent conductor layer includes a heavily-doped polycrystalline layer of the semiconductor material.--

Please add claims 29 and 30.

-- 29. (New) The device as in claim 1, wherein the bias layer is a conducting bias electrode layer.

30. (New) The device as in claim 1, wherein the bias layer is a back contact layer. --